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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,789	08/14/2001	Michael A. Tischler	2771-161-CON	1145

23448 7590 01/03/2005

INTELLECTUAL PROPERTY / TECHNOLOGY LAW  
PO BOX 14329  
RESEARCH TRIANGLE PARK, NC 27709

EXAMINER
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SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 01/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/929,789

Applicant(s)

TISCHLER ET AL.

Examiner

Matthew J Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 61, 63-67, 70 and 71 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 70 and 71 is/are allowed.
- 6) ☒ Claim(s) 61 and 63-67 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All - b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 61 and 63-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akad (DD 224341A) in view of Van Hove et al (US 5,278,435).

Akad discloses a method of separating an epitaxial layer of gallium nitride from a sapphire substrate used for deposition by using a BN layer grown on the substrate and growing

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GaN on the BN layer (Abstract). The Sapphire substrate reads on applicants' heterogeneous substrate.

Akad does not teach the epitaxial GaN layer is a single crystal.

In a method of growing GaN, Van Hove et al teaches a method of growing single crystal aluminum gallium nitride ( $\text{Al}_x\text{Ga}_{1-x}\text{N}$  wherein  $x=0$  to 1) (col 1, ln 55-67). Van Hove et al also teaches using a sapphire substrate and an intermediate matrix layer of boron nitride is used to ease the lattice mismatch between the single crystal aluminum gallium nitride and the substrate (col 3, ln 1-35). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Akad with Van Hove et al's single crystal GaN because single crystalline materials are useful in semiconductor devices.

Referring to claims 64-67, the combination of Akad and Van Hove et al teach an intermediate layer of BN as a buffer. The combination of Akad and Van Hove et al is silent to the intermediate layer includes a template layer, a protective layer or an etch stop layer. However, these limitations are considered to be intended use limitations and a recitation of intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the claimed intended use, then it meets the claim. The BN layer taught would inherently be capable of performing the claimed intended use.

#### ***Response to Arguments***

4. Applicant's arguments with respect to claims 61 and 63-67 have been considered but are moot in view of the new ground(s) of rejection.
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5. Applicant's arguments, see page 6 of the remarks, filed 11/22/2004, with respect to Akasaki have been fully considered and are persuasive. The rejection of claims 61, 63-67 and 70-71 has been withdrawn. Akasaki teaches forming a single crystal GaN on a buffer layer formed on sapphire. There is no reasonable expectation of success that single crystal GaN can be formed on the AlAs release layer taught by Gmitter or as a laterally grown layer, as taught by Bozler because Bolzer requires growth of the single crystalline material from the substrate not from a buffer layer.

*Allowable Subject Matter*

6. Claims 70-71 are allowed.

7. The following is an examiner's statement of reasons for allowance: The closest prior art is Akad (DD 224341A). Akad teaches method of separating a epitaxial GaN layer from a sapphire substrate by creating thermal stress, which cause the layer to separate during cooling. Akad does not teach or suggest etching the substrate to remove the substrate.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion*

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8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Edmonds (US 3,806,777) teaches gallium nitride is a useful substrate for making light emitting PN junctions (col 3, ln 5-20).

Hasegawa et al (US 4,168,998) teaches removing wafers from a substrate by using a carbonaceous powder (Abstract).


JP 52-103399 teaches overgrowth of GaN on a silicone base (English Abstract).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew J Song  
Examiner  
Art Unit 1765

NADINE G. NORTON  
SUPERVISORY PATENT EXAMINER  


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